CLAIMS

1. A fluorine-containing compound of the formula:

$CH_2=C(-X)-C(=O)-Y-[-(CH_2)_m-Z-]_p-(CH_2)_n-Rf$ (I)

wherein X is a fluorine atom, a chlorine atom, a bromine atom, a iodine atom, a CFX^1X^2 group (wherein X^1 and X^2 is a hydrogen atom, a fluorine atom or a chlorine atom), a cyano group, a linear or branched fluoroalkyl group having 1 to 20 carbon atoms, a substituted or unsubstituted benzyl group, or a substituted or unsubstituted phenyl group;

Y is -O- or -NH-;

Z is -S- or $-SO_2-$;

Rf is a fluoroalkyl group having 1 to 21 carbon atoms;

m is from 1 to 10, n is from 0 to 10, and p is 0 or 1.

2. The fluorine-containing compound according to claim 1, wherein the carbon number of the fluoroalkyl group (Rf group) is from 1 to 6.

3. The fluorine-containing compound according to claim 1, wherein the carbon number of the fluoroalkyl group (Rf group) is from 1 to 4.

4. The fluorine-containing compound according to claim 1, wherein the fluoroalkyl group (Rf group) is a perfluoroalkyl group.

5. A fluorine-containing polymer comprising (A) repeating units derived from the fluorine-containing compound (a) according to claim 1.

6. The fluorine-containing polymer according to claim 5, further having:
(B) repeating units derived from (b) a monomer free from a fluorine atom, and
(C) optionally, repeating units derived from (c) a crosslinkable monomer,
in addition to the repeating units (A).

7. The fluorine-containing polymer according to claim 5, wherein the fluorine atom-free monomer (b) forming the repeating units (B) is acrylates of the general formula:

$CH_2=CA^1COOA^2$

wherein A^1 is a hydrogen atom or a methyl group, and
A^2 is a hydrocarbon group having 1 to 30 carbon atoms (particularly an alkyl group represented by C_nH_{2n+1} (n = 1 to 30)).

8. The fluorine-containing polymer according to claim 6, wherein the crosslinkable monomer (c) forming the repeating units (C) is a fluorine-free monomer having at least two reactive groups and/or carbon-carbon double bonds.

9. The fluorine-containing polymer according to claim 6, wherein the amount of the fluorine atom-free monomer (b) is 0.1 to 50 parts by weight, and
the amount of the crosslinkable monomer (c) is at most 20 parts by weight,
based on 100 parts by weight of the fluorine-containing compound (a).

10. A surface treatment agent comprising the fluorine-containing polymer according to claim 5 and water and/or an organic solvent.

11. The surface treatment agent according to claim 10, which is in the form of a solution, an emulsion or an aerosol.

12. A method of treating a substrate with the surface treatment agent according to claim 10.

13. The method according to claim 12, wherein the substrate is a textile, a masonry, a filter (for example, an electrostatic filter), a dust protective mask, a fuel cell, glass, paper, wood, leather, fur, asbestos, brick, cement, metal and oxide, ceramics, plastics, a coated surface or a plaster.

14. A textile treated with the surface treatment agent according to claim 10.

15. A carpet treated with the surface treatment agent according to claim 10.

16. A method of producing a fluorine-containing compound of the formula:

$CH_2=C(-X)-C(=O)-NH-(CH_2)_n-Rf$

wherein X is a fluorine atom, a chlorine atom, a bromine atom, a iodine atom, a CFX^1X^2 group (wherein X^1 and X^2 is a hydrogen atom, a fluorine atom or a chlorine atom), a cyano group, a linear or branched fluoroalkyl group having 1 to 20 carbon atoms, a substituted or unsubstituted benzyl group, or a substituted or unsubstituted phenyl group;

Rf is a fluoroalkyl group having 1 to 21 carbon atoms; and

n is from 0 to 10,

said method comprising, in the presence of a base, reacting an amine compound of the formula:

$H_2N-(CH_2)_n-Rf$

wherein Rf is the same as defined above and n is from 0 to 10,

with an acid chloride compound of the formula:

$A-CH_2-CH(-X)-C(=O)-Cl$

wherein A is a halogen atom (particularly a chlorine atom, a bromine atom or a iodine atom); and

X is a fluorine atom, a chlorine atom, a bromine atom, a iodine atom, a CFX^1X^2 group (wherein X^1 and X^2 is a hydrogen atom, a fluorine atom or a chlorine atom), a cyano group, a linear or branched fluoroalkyl group having 1 to 20 carbon atoms, a substituted or unsubstituted benzyl group, or a substituted or unsubstituted phenyl group.